

ENVIRONMENTAL IMPACT ASSESSMENT PROCESS
FINAL IMPACT ASSESSMENT REPORT

PROPOSED PROJECT BLUE WIND ENERGY
FACILITY, NORTH OF KLEINSEE

NORTHERN CAPE PROVINCE
(DEA Ref: 12/12/20/2331/1)

SUPPLEMENTARY REPORT
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FINAL SUBMITTED TO DEA

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PROJECT DETAILS

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Proposed Project Blue Wind Energy Facility North of
Kleinsee in the Northern Cape Province

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BACKGROUND AND INTRODUCTION

Diamond Wind (Pty) Ltd, an Independent Power Producer (IPP), is proposing the establishment of a commercial wind energy facility on a site north of the town of Kleinsee within the Nama Khoi Local Municipality in the Northern Cape Province. The site is located within a De Beers mining area for the establishment of a wind energy facility. The facility will be referred to as the **Project Blue Wind Energy Facility**.

1.1. Overview of the Proposed Project

The facility is proposed to be established within an area of ~3 330 ha in extent. The facility will utilise up to 54 turbines with a hub height of up to 120m and a rotor diameter of up to 126m. The entire facility would have a capacity of up to 150 MW¹. Other infrastructure associated with the wind energy facility is proposed to include:

- » **Towers** (steel or concrete) and **foundations** to support the wind turbines.
- » **Step-up transformer prefabricated concrete huts** may be necessary at the base of the turbines. This would comprise a small hut of 6x3x2m containing an electrical transformer.
- » **Cabling** between the turbines, to be lain underground where practical, which will connect to an on-site substation.
- » An overhead **power line** up to 220kV, to connect the facilities to the Gromis substation;
- » **Internal roads** (approximately 6 m in width) linking the wind turbines and other infrastructure on the site. Existing roads will be used as far as possible;
- » **A substation** located within the wind energy facility, comprising a high-voltage (HV) yard footprint of approximately 80m x 90m is proposed; and
- » **A workshop** area for maintenance and storage.

The identified site is regarded as favourable due to the wind resource, the disturbed nature of the broader area due to mining activities, availability of the land for the proposed development, and proximity to a suitable electricity connection point. The proposed site for the wind energy facility has been determined in consultation with De Beers (the main affected landowner), and has taken cognisance of the current and proposed mining plans for the broader area

¹ Note that the project would be bid to the Department of Energy in line with the requirements of the REIPPP conditions, which includes a maximum capacity of 140MW.

in order to ensure no impacts in this regard. As a result, no feasible site alternatives have been identified for investigation for the project.

1.2. Overview of the Environmental Impact Assessment Process to date

Site-specific studies and assessments have been undertaken through an Environmental Impact Assessment process in order to confirm the environmental feasibility of the proposed project and to delineate any areas of environmental sensitivity within the study area. A preliminary layout was compiled by the Project Developer for assessment within the EIA process. Through the EIA process, this layout was amended to avoid no-go areas and areas of very high sensitivity (as presented in Figure 1). Following the submission of a Final EIA Report (FEIR) in July 2012, and an Addendum Report in January 2013 following a request for additional information from the Department of Environmental Affairs (DEA), the competent authority for the project, the DEA rejected the Final EIA Report (in May 2013) and requested that the findings of 4 seasons bat and bird Pre-construction monitoring be submitted with the FEIR in order for the Department to make an informed decision (refer to Appendix A).

A pre-construction bat and bird monitoring programme was therefore initiated by the Project Developer for the site. This report presents the results of the 4 seasons' monitoring completed for the site (between July 2013 and March 2014), and also presents confirmation of the predicted impacts assessed for bats and birds at the site in relation to the proposed facility within the EIA, as informed by the results of the pre-construction monitoring.

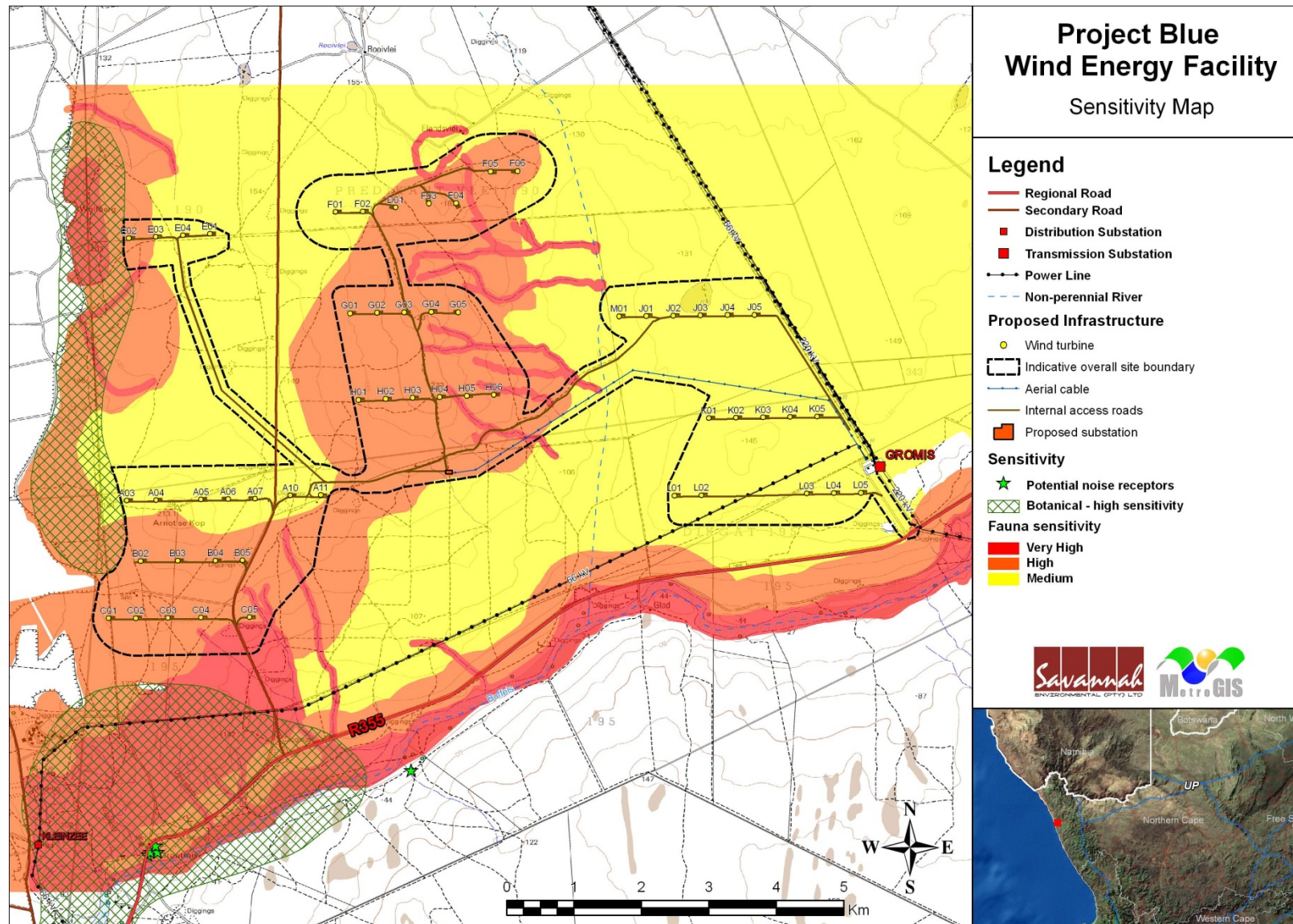


Figure 1: Proposed layout of the Project Blue Wind Energy Facility overlain on the environmental sensitivity map as compiled through the EIA process

PURPOSE OF THE SUPPLEMENTARY REPORT

The purpose of this Supplementary Report to the Final EIA Report is to present the results of the 4 seasons' pre-construction bat and bird monitoring completed for the Project Blue Wind Energy Facility, as well as the final conclusions regarding potential impacts on bat and bird communities within the proposed facility, as informed by the results of the pre-construction monitoring. As required by the DEA and Regulation 56(6) of the EIA Regulations, this report is being made available to registered Interested and Affected Parties (I&APs) for review and comment prior to submission to the DEA for review and decision-making.

This report was made available for a 21-day review period (as agreed with the DEA) from **20 March – 10 April 2014 at www.savannahsa.com/projects**. Registered I&APs were notified of the availability of this report in writing, and were advised that electronic copies were available from the Environmental Assessment Practitioner (EAP) on request (refer to Appendix F).

During this review period, a meeting was held with Birdlife (on 7 April 2014). The purpose of this meeting was to present the findings of the bird and bat monitoring programmes at the Project Blue site. No specific comments were noted by BirdLife during this meeting.

No comments on this Supplementary Report were received during this review period.

APPROACH TO THE SUPPLEMENTARY REPORT & FINALISATION OF THE EIA PROCESS

Pre-construction bat and bird monitoring has been undertaken for the Project Blue Wind Energy Facility over a period of 4 seasons. Reports which detail the findings of these programmes and the potential impacts and sensitivities of the site are presented in this report. The results of this monitoring have been provided to the avifauna specialist (Dr Rob Simmons) who completed the avifaunal impact assessment for the proposed project as part of the EIA process. Dr Simmons has provided an independent opinion regarding the alignment of the findings of the pre-construction monitoring with the results of the avifaunal impact assessment completed as part of the EIA process (refer to Appendix E).

A similar approach was not undertaken for the bat communities since potential impacts on bats was assessed as part of the faunal impact assessment and not as a separate assessment. This assessment only presented the possibility of the presence of bat species on the site and recommended the need for pre-construction monitoring. No specific impact assessment was completed. The bat monitoring report therefore presents details of the potential impacts on bat communities and indicates potential sensitive areas.

The results of the 4 seasons' pre-construction monitoring completed for the site therefore informs the findings of the EIA studies. As detailed in the previous section, this report has been made available for public review and comment. Following this comment period, this supplementary report will be finalised and submitted to the DEA in order for the authority to make an informed decision regarding the proposed project.

PROJECT INFORMATION AND DEA INFORMATION REQUIREMENTS

The following project information is also presented in this report in order to ensure fulfilment of the requirements of the EIA Regulations and those of the DEA:

1. An assessment of cumulative impacts associated with the proposed project and other developments (including other wind energy facilities) operating or proposed in the region (i.e. within 100km).
2. Co-ordinates of the proposed power line (start, mid and end points), as well as the turbine positions, as requested by the DEA in the letter dated 28 May 2013. This information is presented in Appendix B.

PRE-CONSTRUCTION BAT MONITORING

1. Summary of the Findings of the Pre-Construction Bat Monitoring

The detailed results of the pre-construction bat monitoring programme completed between July 2013 and March 2014 (both inclusive) is presented in Appendix C. This monitoring programme has been developed and undertaken considering the requirements of the “Best practice guidelines for pre-construction surveying bats at proposed wind energy development sites in southern Africa” (Sowler & Stoffberg 2012). The programme was adapted to the project specifics and site characteristics, as provided for within the guideline.

The pre-construction monitoring programme confirmed the occurrence of 4 bat species (refer to Table 1 below) and the potential occurrence of 2 additional bat species in the study area. Only one of the confirmed species is considered to be of conservation concern and classified as “Near Threatened” by the South Africa Red List, i.e. the Natal long-fingered bat.

Table 1: Bat species with confirmed occurrence in the study area

Common name	Scientific name	Conservation status		Risk of collision (Sowler & Stoffberg, 2012)
		Global (IUCN, 2012)	National (Friedmann & Daly, 2004)	
Long-tailed serotine	<i>Eptesicus hottentotus</i>	LC	LC	Medium
Natal long-fingered bat	<i>Miniopterus natalensis</i>	LC	NT	Medium-High
Cape serotine	<i>Neoromicia capensis</i>	LC	LC	Medium-High
Egyptian free-tailed bat	<i>Tadarida aegyptiaca</i>	LC	LC	High

Bat activity in the study area was overall very low, even when comparing with other locations in South Africa. Considering the seasonal activity patterns, it was concluded that bats were more active during spring with the level of activity decreasing until the autumn. Only one survey was conducted during the autumn season to date but considering the low activity registered on site during the programme completed up to date, a significant increase in bat activity is not expected for the remaining monitoring period.

Among the environmental variables, wind speed and temperature were considered to have an influence on bat activity. In this regard, bat activity was lower at higher wind speeds and higher temperatures.

Three active bat roosts were identified in the broader surroundings of the study area, with observation of individuals in one of them. The remaining two locations were confirmed as bat roosts only through the observation of bat droppings on site. No other suitable locations for roosting were identified within the wind energy facility site.

The analysis of bat activity recorded during the pre-construction monitoring and environmental features in the study area led to the classification of the study area as having a **low sensitivity for bats**. Therefore **no no-go or high sensitivity areas were identified, and no constraints to the current wind turbine layout** are foreseen.

Considering the potential impacts of collision fatalities of bat species occurring in the area, it was important to analyse their risk of collision with wind turbines. This analysis has shown that one bat species with confirmed occurrence on the site has a high risk of collision with the wind turbines (refer to Table 1 above), and another 2 bat species have medium to high potential collision risk. These species are common and widespread but may be affected by the operational phase of this project. Therefore mitigation measures are proposed to reduce the probability and significance of such impacts on local bat communities.

2. Confirmation of the Results of the Impact Assessment as Informed by the Pre-construction Monitoring

During the Environmental Impact Assessment no stand-alone Bat Impact Assessment Report was compiled, only a Faunal Impact Assessment Report was compiled (Todd 2012). This assessment was undertaken by means of a desktop study complemented with a site visit in May 2013.

This assessment concluded that the site is likely to be poor in bat species diversity, due to the arid vegetation and climate. However 14 species were noted as possibly occurring in the area, including two species of conservation concern, i.e. the Cape horseshoe bat (*Rhinolophus capensis*) and Angolan wing-gland bat (*Cistugo seabrai*). Some suitable roosting locations were identified along the Buffels River and foraging areas were noted along the drainage lines. These were considered suitable for most of the species likely to occur at the site.

Regarding the potential impacts over bat populations, the risk of bats colliding with turbines while foraging, migrating or moving between areas was highlighted.

The most likely areas for this impact were considered to be near Grootmis and along the coastal bluff. Mitigation measures suggested included the implementation of a bat monitoring programme according to the South African Good Practice Guidelines for Surveying Bats in wind Farm Developments (Sowler & Stoffberg, 2012), as soon as possible; and the adjustment of turbine placement, if required, considering the findings and recommendations from the monitoring studies.

The conclusions of this assessment regarding the suitability of the site and potential impacts have been confirmed through the pre-construction monitoring programme implemented. Two species identified in the impact assessment as potentially occurring on the site (i.e. African straw-coloured fruit bat and Egyptian rousette) were considered to be unlikely to occur on the site as a result of the absence of suitable habitat available for these species.

It is concluded that the results of the pre-construction bat monitoring completed to date shows that the EIA study undertaken is conservative and that the confidence in the findings of the EIA can be considered to be high.

3. Implications for Project Implementation

Although the site proposed for the establishment of the Project Blue Wind Energy Facility is considered to be of low sensitivity in terms of bat communities, it is unavoidable that some species will occur at the site and that the probability of collision with turbines for some of them is high, although the significance of impacts is expected to be low. For this reason mitigation measures are required to be implemented during operational phase. General recommendations in this regard are detailed in the bat monitoring report contained in Appendix B, with the most important highlighted below.

Mitigation of bat impacts on wind energy facilities should be site specific and an evolutionary process along the development life. For the construction phase some measures are suggested in order to minimise the potential impacts identified:

- » Adequate training should be provided to all the construction personnel regarding bats and possible sensitivities. Everybody working in the area should be aware of the sensitive areas, be alert to the possible presence of bats, especially when working close to potential roosts (per example abandoned buildings).
- » The construction works should be supervised, according to the plan to be detailed before construction, by a bat specialist on site, in order to further

identify any conflict situations between the construction works and bats, and readily take actions to minimise any identified impacts.

- » Minimise areas of construction as far as possible.
- » If any building, trees, or any structure with potential to provide bat roosting, needs to be demolished, then it should be conducted a visit, prior to the commence of the works, by one specialist to verify the presence / absence of bats.
- » In the case that any confirmed or potential bat roost is to be affected (e.g. through utilisation conversion, demolition, recuperation) a bat specialist should confirm bat occupancy and define the necessary measures to be implemented to minimise the impact if necessary.

The occurrence of at least one species considered to have a high collision risk with wind turbines, and with recorded fatalities in wind energy facilities in South Africa, has been confirmed in the study area (i.e. *Tadarida aegyptiaca*). This species has a high risk of collision due to its flight characteristics. It is an open-air forager, which may fly at high altitudes, therefore being potentially within the rotor swept area. Since this species is considered to be potentially affected by the operational phase of the project a set of measures are proposed in order to minimise the potential bat fatalities:

- » If high collision risk areas are identified during the operational phase, or a high number of bat fatalities due to wind turbines are recorded, this should be evaluated by the designated bat specialists as soon as possible. Subsequent mitigation measures, adjusted to the risk situation identified, should then be proposed and implemented;
- » If turbines are to be lit at night, lighting should be kept to a minimum and should be directed downwards.
- » Ensure the implementation of a post-construction monitoring programme (operation phase) to survey bat communities within the wind energy facility and the impacts resulting from the installed infrastructure. The results of the operational phase monitoring programme must be taken into account for the implementation of further mitigation measures, if necessary.

A rigorous and well planned monitoring programme is considered to be one of the most effective measures to validate the potential impacts identified and verify the effectiveness of the mitigation measures proposed. A well-designed monitoring programme of the subsequent phases of the development will provide important insights on the impacts of the wind energy facility at early stages allowing making any necessary adjustments to what have been previously proposed. It will also allow verification of the effectiveness of the mitigation measures implemented and inform the need to adjust or amend these with more effective measures.

4. Conclusions and Recommendations (Impact Statement)

The data collection analysis during the pre-construction phase, allowed the characterisation of the bat community present within the site proposed for the establishment of the Project Blue Wind Energy Facility, and predicts the potential effects that the implementation of this project may have over bat populations in the study area. This study concluded that the area is of low attractiveness for bats, and is used very little. Therefore the overall site was considered of **low sensitivity for bats**. **No no-go or high sensitivity areas were identified** and the results of the impact assessment were confirmed. **No layout adjustments** for the proposed facility are therefore considered necessary. However, the risk of collision was identified for 3 bat species with confirmed occurrence on the site. Therefore, mitigation measures are proposed to reduce the probability and significance of such impacts on local bat communities to acceptable levels.

PRE-CONSTRUCTION BIRD MONITORING

1. Summary of the Findings of the Pre-Construction Bird Monitoring

The detailed results of the pre-construction bat monitoring programme completed between July 2013 and March 2014 (both inclusive) is presented in Appendix D. This monitoring programme has been developed and undertaken considering the requirements of the "Best practice guidelines for avian monitoring and impact mitigation at proposed wind energy development sites in southern Africa" (Jenkins et al. 2012). The programme was adapted to the project specifics and site characteristics.

Twelve bird species recorded during the field surveys are considered sensitive to the impacts of wind energy facilities: i.e. Black-chested Snake Eagle, Jackal Buzzard, Pale Chanting Goshawk, African Black Oystercatcher, Greater Kestrel, Lanner Falcon, Peregrine Falcon, Kori Bustard, Ludwig's Bustard, African Sacred Ibis, Greater Flamingo and Lesser Flamingo. From these 12 species, 7 are listed as having a conservation status of concern: i.e. African Black Oystercatcher, Lanner Falcon, Peregrine Falcon, Greater Flamingo and Lesser Flamingo, all classified as Near Threatened; and Kori Bustard and Ludwig's Bustard, considered Vulnerable.

The overall activity in the wind energy facility site, for the general community was very low, compared with known results from other sites of South Africa or even within the Northern Cape Province. The arid conditions of the vegetation, the absence of trees, suitable perching locations and roosting or nesting available locations may be a major influence on the low activity levels detected. The low activity dictates that the collision risk is low. However, the risk cannot be excluded. Some large bird species, such as the Kori Bustard and Ludwig's Bustard, which were recorded on the site, are considered sensitive to collisions with power lines, which was confirmed during the monitoring programme. These sensitive species were not recorded frequently on the proposed project site, but where detected in the vicinity of the existing overhead power line, located east of the study area. No breeding evidence of bustards was detected within the site or its immediate surroundings during the two winter surveys already conducted as part of the monitoring programme. Some nesting areas utilised by kestrel species were recorded during the monitoring programme. These are additional to the Bustard nest recorded during the EIA process and could be considered to be potentially sensitive, especially during breeding season. No migratory birds (e.g. Pelicans and Flamingos) were identified using the proposed site through the monitoring completed to date.

The results of the pre-construction monitoring programme conducted to date indicated that the major concerns would be directed to risk of collision of Bustards with power lines, and the risk of collision with wind turbines associated with the nests of kestrels identified within the wind energy facility². Considering the general low bird activity on site recorded within the pre-construction monitoring, the study area was classified as having a general **low sensitivity for birds**, with areas of medium sensitivity in areas due to the presence of nesting locations used for reproduction. **No no-go-areas** for the placement of turbines or other infrastructure were identified through the pre-construction monitoring programme. However, a number of potential impacts were identified which require the implementation of an appropriate mitigation strategy.

2. Confirmation of the Results of the Impact Assessment as Informed by the Pre-construction Monitoring

During the Environmental Impact Assessment process an Avifaunal Impact Assessment Report (Simmons & Martins 2012) was compiled. This document reviewed the location of the wind energy facility using published bird-atlas information and field work.

From the findings of this study it was concluded that this proposed site may support at least 168 bird species, from which 15 species have a conservation status of concern, and 44 are endemic species. The main facts, regarding birds, potentially conditioning the development were identified and are summarised below:

- » Presence of bustards that move into the area with good rainfall (e.g. breeding Ludwig's Bustards).
- » Presence of flocking water birds such as red-listed cormorants and flamingos (e.g. White Pelicans).
- » Presence of fifteen raptor species (e.g. Secretarybirds, (breeding) Jackal Buzzards, Greater Kestrel and Black Harrier).
- » Presence of endemic passerines (26% of the total number of species) which could be affected by disturbance impacts.
- » The above-mentioned species were identified on site during the visits conducted and are all considered to be collision-prone species. Considering the species characteristics and the occurrence of breeding behaviours, the potential identified impacts were:
 - * Habitat alteration by the facility itself and associated power lines or substation/s;

² It should be noted that nesting areas are only considered sensitive during the reproduction periods when these nests are used. With the implementation of the proposed mitigation measures these areas are considered to be of lower sensitivity.

- * Disturbance by construction and maintenance activities;
- * Possible displacement or disturbance of sensitive species;
- * Direct collision with blades of the wind turbines or the associated power line network;
- * Electrocution of larger avifauna species on the power lines.

During this assessment three nesting locations were identified: one of Greater Kestrel, another nest of Jackal Buzzard and a nest of Ludwig's Bustard. No important water features were identified on site, however some concerns were raised regarding migratory birds species (such as flamingos and pelicans) that could use the area as a flight corridor to commute between breeding and feeding areas such as the Orange River mouth, located to the north of the site. No particular no-go areas were identified in this assessment, however it was highlighted that Areas 2 and 3 of the proposed wind energy facility were high risk zones for threatened birds given the presence and breeding of collision-prone bustards in these areas.

To mitigate the possible issues raised above it was recommend that:

- » Power lines should be marked with bird flappers to reduce possible collisions with large migrating birds.
- » Turbine blades should be marked with UV paint to increase the probability that birds flying through the area see and avoid them.
- » Turbine strings are orientated north-south where possible to reduce the possibility that birds migrating along the coast collide with the turbines or are attracted to them.

A 12-month pre-construction phase monitoring of all birds, was also recommended in order to provide more detailed assessments of all impacts, provide passage rates of critical species and inform on recommended mitigation where necessary.

The pre-construction monitoring confirmed the presence of bird species of potential sensitivity to impacts from wind turbines on the site, and identified a number of nests (some of which were being used for reproduction). The Ludwig's Bustard nests identified in the EIA study were however not recorded during the monitoring. No other breeding evidence of these species was recorded in the area to date. Bustard activity on the site was recorded as low during winter and spring, with no activity recorded during the summer season. The presence of these as recorded during the impact assessment are however acknowledged and the areas indicated as possible areas of sensitivity which should be considered in a pre-construction walk through survey to confirm presence of nests and nesting birds. It is noted that activities in the areas where these and other nests on the

site are located should be restricted during the periods these species are actively breeding on site.

The specialist responsible for the Avifauna Impact Assessment undertaken as part of the EIA process, Dr Rob Simmons, reviewed the pre-construction monitoring report and has confirmed that the original assessment and conclusions of the bird impact assessment are accurate (refer to Appendix E). It is confirmed that the mitigation measures proposed within the pre-construction monitoring report are appropriate and should be implemented. Additional mitigation measures are however proposed, specifically relating to the Bustard nests recorded in the EIA study but not recorded within the pre-construction monitoring surveys. These are detailed within Appendix E. Diamond Wind are committed to minimising impacts on the environment, as has been demonstrated in their revisions to the project layout through the EIA process. They have therefore confirmed the feasibility of implementation of turbines with blade tips that do not enter below 40 m above ground level in the identified sensitive areas, as recommended by the avifaunal specialist. In so doing, the collision impacts on the sensitive Bustard species would be avoided as the recorded height of flight is approximately 30m and below.

It is concluded that the results of the pre-construction bird monitoring completed to date shows that the EIA study undertaken is conservative and that the confidence in the findings of the EIA can be considered to be high.

3. Implications for project implementation

Although the site proposed for the establishment of the Project Blue Wind Energy Facility is considered to be of low sensitivity in terms of bird communities, some potential impacts and areas of potential sensitivity were identified. For this reason mitigation measures are required to be implemented during operational phase. General recommendations in this regard are detailed in the bird monitoring report contained in Appendix D, with the most important highlighted below.

Mitigation measures are proposed in order to minimise disturbance over the bird communities present at the site, and are related to each of the predicted impacts. Mitigation of bird impacts on wind energy facilities should be site specific and an evolutionary process along the development life. For the construction phase some measures are suggested in order to minimise the potential impacts identified:

- » Minimise areas of construction to the maximum extent possible;

- » Disturbance during the breeding season of the species nesting in the area should be avoided to prevent and minimise impacts with sensitive species. Therefore, construction activities that involve heavy machinery and are prone to cause significant disturbance should be avoided during the breeding season (i.e. between August and October), if technically viable. The main concern in the area relates to the kestrel sp. nesting along the existing power line servitude and the previously confirmed nesting of Ludwig's Bustard on site. Hence, these activities (e.g. opening roads, clearing of vegetation, movements or operation of heavy machinery, etc.) should be restricted during the periods these species are actively breeding on site in the areas where the nests are located.
- » As an alternative mitigation measure, the relocation of the existing raptor (mainly kestrel species) nesting locations within a 1000 m buffer around the areas of construction could be considered. The relocation of the nests should take place ONLY before the breeding season begins or after the end of the breeding activities of the species. This measure should be evaluated by an experienced avifaunal specialist prior to implementation and an optimal action plan developed for implementation.
- » Prior to the initiation of the construction activities, the area should be effectively searched by an avifaunal specialist to identify any active breeding locations. The most appropriate solutions for the measures to be implemented (either involving the relocation or the definition of no-disturbance areas during construction activities) should be discussed by the avifaunal specialist team on a case-by-case scenario.
- » Before the construction activities begin, all areas to be affected by infrastructures or working areas should be searched for nests of species that nest on the ground, such as Ludwig's Bustard, in order to avoid the impact:
 - * A no-disturbance area of 500 m around the nesting locations should be defined whenever an active raptor or a bustard nest is identified. These should be considered no-go areas during construction within the breeding season (i.e. between August and October).
 - * In the case of bustard's nesting locations, an additional 500 m area with restricted disturbance, where activities with lower disturbance (e.g. people and vehicle movements) could take place, should be considered.
- » Appropriate training should be provided to all the construction personnel regarding avifaunal species and the need to minimise impacts in this regard. All persons working in the area should be aware of the sensitive areas and be alert of the potential impacts of the construction phase on the bird community.
- » The removal of natural vegetation, especially riparian thicket vegetation or trees should be avoided or, if not technically viable, undertaken with extreme care due to its importance as roosting, nesting and as foraging habitat for birds.

- » Overhead power connection between the facility and the grid connection point should be equipped with bird flappers to reduce collision with large birds (e.g. Ludwig's Bustard).
- » Structures should be designed to reduce the availability of perching sites in the area close to the turbines.

As potential impacts are expected during the operational phase, the following mitigation measures are recommended:

- » Maintenance staff should be encouraged to keep noise and other disturbances to a minimum. If a confirmed nesting location of target species is confirmed within the wind energy facility, activities requiring heavy machinery must be avoided within 500m from the active nests during the breeding season unless otherwise agreed with the environmental supervisor of the works and an avifaunal specialist.
- » It is recommended that any cattle carcass should be removed from the surroundings of the turbines as soon as possible. This could attract carrion birds and some raptors that act as facultative scavengers.
- » Reduce, as far as possible, the existence of (or creation of new) structures suitable for raptors and falcons perching sites within the wind facility site, in order to avoid the utilisation of areas close to wind turbines.
- » The implementation of additional alternative nesting specific structures (e.g. modified electric poles, with nesting support) in areas further away from the wind energy facility should be considered. This will contribute to compensating for the loss of suitable nesting locations by the implementation of previous measures and to promote the utilisation by the species of areas at a safer distance from the wind turbines, particularly, where fledglings or juvenile bird collision risk can be considerably reduced.
- » Before the start of the operational phase of the project the area should be searched for any new nests that may impose the implementation of further mitigation measures due a new risk of impact.

A rigorous and well planned monitoring programme is considered to be one of the most effective measures to validate the potential impacts identified and verify the effectiveness of the mitigation measures proposed. A well-designed monitoring programme of the subsequent phases of the development will provide important insights on the impacts of the wind energy facility at early stages allowing making any necessary adjustments to what have been previously proposed. It will also allow verification of the effectiveness of the mitigation measures implemented and inform the need to adjust or amend these with more effective measures.

4. Conclusions and Recommendations (Impact Statement)

Considering the general low bird activity on site recorded within the pre-construction monitoring, the study area was classified as having a general **low sensitivity for birds**, with areas of medium sensitivity in areas due to the presence of nesting locations used for reproduction. The main concerns identified during the pre-construction monitoring year were:

- » The presence of nesting locations, mainly kestrels, within the site, especially central and western sections of the development and associated with linear infrastructures such as power lines that provides suitable substrate;
- » The detection of a community of raptors, presenting some potential risk areas especially surrounding the existing aerial power line located east of the facility site;
- » Presence of endangered species such as Ludwig's Bustards (though recorded in low numbers within restricted locations through the programme implemented to date.

No no-go-areas for the placement of turbines or other infrastructure were identified through the pre-construction monitoring programme. **No layout adjustments** are therefore **recommended** from the results of the monitoring undertaken. However, a number of potential impacts were identified which require the implementation of an appropriate mitigation strategy.

ASSESSMENT OF CUMULATIVE IMPACTS

Cumulative impact, in relation to an activity, refers to the impact of an activity that in itself may not be significant but may become significant when added to the existing and potential impacts eventuating from similar or diverse activities or undertakings in the area³. To some extent a cumulative impact is a regional impact, rather than the local site scale impact, i.e. if something has a regional impact it also has a cumulative impact.

As it is not always reasonably viable to consider in the analysis all the existing or proposed projects for a certain region, the analysis should focus on:

- » The projects (for which there is information readily available) known for the area and its surroundings and that could be relevant in terms of the expected impacts, in relation to the project under assessment;
- » The target species more relevant and/or susceptible to the expected impacts.

Even where impacts may appear low, adequate attention should be given to the assessment of cumulative effects, as the impact of several impacts on the same environmental aspect could be considerable, particularly if these are located in the same region and impact on the same population of a species. Most of the long-lived and slow reproducing Red Listed species may not be able to sustain any additional mortality factors over and above existing factors.

The main activities or project, relevant for the cumulative impacts analysis known in the broader area of the Blue Wind Energy Facility are human activities, namely mining activities and other proposed wind energy facilities. Potential cumulative associated with the proposed facility are assessed within the EIA Report compiled for the project. This section of the report presents the potential cumulative impacts on bat and bird communities on the basis of the results of the pre-construction monitoring.

Cumulative Impacts as a result of Impacts associated with Mining activities:

The study area is located in close proximity to a severely transformed area, used for extensive mining activities. This area is currently undergoing a process of vegetation recovery as part of rehabilitation efforts, and is not expected to expand to a broader area. The existing mining activities are expected to have already impacted on the bat and bird communities in the area (largely through

³ Definition as provided by DEA in the EIA regulations.

habitat disturbance) and therefore, these activities are not expected to contribute cumulatively towards any impacts which may result from the implementation of the wind facility. The rehabilitation of the area and recovery of the natural vegetation, may present alternative foraging grounds to bat communities and/or habitats for bird communities which could potentially be displaced by the establishment of the wind energy facility.

Cumulative Impacts as a result of Impacts associated with Other wind energy facilities:

At least another four wind energy developments are planned to be implemented in the area. This is based on information provided by the CSIR (2012), and the project team's knowledge of the broader area. These facilities include the 75MW Kangnas Wind Energy Facility (located approximately 100 km west of the site), 7.2MW Konignaas Wind Energy Facility (located 60km south of the site), 120MW Kannikwa Vlakte Wind Energy Facility (located approximately 20km north of the proposed site) and 200MW Kleinsee Wind Energy Facility (located approximately 13km south of the site). None of these facilities are currently under construction and none have been selected as preferred bidders by the Department of Energy. It should however be noted that the Kleinsee Wind Energy Facility is proposed by Eskom Holdings Limited and not by an IPP and therefore is not to be bid to the Department of Energy.

What the above implies in terms of the analysed impacts and data gathered during the pre-construction monitoring programme would be that the sum of the fatalities of the four other wind developments could have detrimental effects at the local scale for some species, such as the Cape Serotine bat, with fatalities already recorded in other facilities in South Africa, and the most common bird species, such as the Cape Crow (although crow species, due to their behaviour are not considered to be significantly affected by the wind turbines).

It is not expected that these facilities would result in additional cumulative impacts to a particular bat community, as bats usually do not commonly travel distances of more than 50 km between summer and winter roosts (Monadjem et al. 2010). The main concern from the wind facilities located in the broader region relates to bat species that make medium to long migrations such as the Natal long-fingered bat. Baseline information on migration and dispersion of bat species in South Africa is deficient and it is possible that the individuals identified were not using the area while on migration, but rather as a foraging area. This reduces the probability of impact on these species from cumulative impacts.

For endemic bird passerines, the cumulative effects of the mortality produced by the combination of the different wind farms could have some effects on local

populations. It is not considered that this impact would be critical but careful monitoring of these effects is advised in order for them not to occur eventually at the regional or national level. In terms of cumulative effects the project could have a greater impact on local bird communities, and therefore its impacts would be considered low to medium, as some species of conservation concern (such as the Ludwig's Bustard which has been recorded on other sites in the region) may be affected by these cumulative effects.

CONCLUSIONS AND RECOMMENDATIONS

A 4 season's bird and bat monitoring programme has been implemented for the Project Blue Wind Energy Facility in terms of the requirements of the DEA and the applicable Best Practice Guidelines for pre-construction monitoring at wind energy facilities in South Africa. This programme allowed for the characterisation of the bat and bird communities present within the site, and predicts the potential effects that the implementation of this project may have over bat and bird populations in the study area

The following has been concluded from the monitoring completed to date:

Bat communities:

- » The site is considered to be of low attractiveness for bats, and is used very little. Therefore the overall site was considered of **low sensitivity for bats**.
- » No no-go or high sensitivity areas were identified in terms of bats, and the results of the impact assessment were confirmed. **No layout adjustments for the proposed facility are therefore considered necessary.**
- » The risk of collision was identified for 3 bat species with confirmed occurrence on the site. Therefore, mitigation measures are proposed to reduce the probability and significance of such impacts on local bat communities to acceptable levels.
- » **Cumulative impacts** on bat communities as a result of the mining activities on the area and other proposed wind energy facilities are **expected to be limited**

Bird Communities

- » Considering the general low bird activity on site recorded within the pre-construction monitoring, the study area was classified as having a general **low sensitivity for birds**, with areas of medium sensitivity in areas due to the presence of nesting locations used for reproduction. The main concerns identified during the pre-construction monitoring year were:
 - * The presence of nesting locations, mainly kestrels, within the site, especially central and western sections of the development and associated with linear infrastructures such as power lines that provides suitable substrate;
 - * The detection of a community of raptors, presenting some potential risk areas especially surrounding the existing aerial power line located east of the facility site;
 - * Presence of endangered species such as Ludwig's Bustards (though recorded in low numbers within restricted locations through the programme implemented to date.

- » No no-go-areas for the placement of turbines or other infrastructure were identified through the pre-construction bird monitoring programme, although some areas of sensitivity during construction were highlighted specifically those areas surrounding the nests on site used for reproduction). **No layout adjustments are recommended** from the results of the monitoring undertaken.
- » A number of potential impacts on birds were identified which require the implementation of an appropriate **mitigation strategy**.

The implementation of a rigorous and well planned post-construction monitoring programme for both birds and bats is considered to be one of the most effective measures to validate the potential impacts identified and verify the effectiveness of the mitigation measures proposed. A well-designed monitoring programme of the subsequent phases of the development will provide important insights on the impacts of the wind energy facility at early stages allowing making any necessary adjustments to what have been previously proposed. It will also allow verification of the effectiveness of the mitigation measures implemented and inform the need to adjust or amend these with more effective measures.

This monitoring programme should have a minimum duration of 2 years during the operational phase, with its continuity being revised following consideration of the results obtained. The post-construction monitoring programme should follow the recommendations of the authorities, Birdlife and any guidelines that may become relevant in this respect. This on-going monitoring should include both the continuation of the assessment of the bat and bird communities on the site, complementing the information gathered during the pre-construction phase and allowing the detection of potential changes and effects caused by the project.

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